

Claims

1. A flexible pouch comprising:
 - a front panel;
 - 5 a rear panel;
 - the front and rear panels being joined along opposite side edges;
 - a closed base;
 - 10 an open end opposite the base through which a product can be loaded and which is to be closed by a seal which joins the front and rear panels together; and
 - 15 a transparent region in at least one of the front and rear panels which overlaps the region of the front and rear panels at which the seal is to be formed to facilitate inspection of the seal to determine the integrity of the heat seal.
2. The pouch of claim 1 wherein a translucent filter of constant colour is provided on one of the panels so the seal, when formed, is between the translucent filter and the said at least one of the front and rear panels, so if the seal is properly formed, a substantially uniform intensity of light will be transmitted through the filter.
- 25 3. The pouch of claim 1 or 2 wherein the transparent region is provided adjacent a top edge of the front panel of the pouch.
4. The pouch of claim 2 wherein the transparent strip includes a fluorescing material which fluoresces when subjected to light of a particular wavelength to produce white light, and wherein when the front and rear panels are sealed together, the transparent region and the adjacent portion of the other of the front or rear panel 30 forms a continuous waveguide for transmission of the white light so that any failure of the seal where the transparent strip and the said adjacent portion do not

- 71 -

seal will allow light to disperse, thereby breaking the integrity of the waveguide so that those regions are identifiable by inspection of the said adjacent portion.

5 5. The pouch of claim 4 wherein the said adjacent portion is translucent to define a filter which can be detected by a camera so that dark regions indicative of an improperly formed seal can be identified.

10 6. The pouch of claim 4 wherein the fluorescing material fluoresces when subjected to ultraviolet light.

15 7. The pouch of claim 1 wherein the closed base is defined by a gusset at the base of the pouch connected to the front and rear panels for closing the base of the pouch.

20 8. A container for receiving and supporting flexible pouches, comprising:

a container body having an open top and an open bottom so water can drain through the open top, over the pouches supported in the container and out through the open bottom;

25 a plurality of support elements, each for supporting side edges of the pouch;

first cooperating locator means on an upper portion of the container body;

second cooperating locator means on a lower portion of the container body; and

30 wherein two like said containers are able to be stacked one above the other by the first cooperating locator means of one container engaging the second cooperating locator means of the other container.

35 9. The container of claim 8 wherein the support elements each comprise a pair of spaced apart slots for receiving the side edges of the pouch, each slot having a

- 72 -

guide entrance formed by a pair of inclined surfaces which incline outwardly from the slot and downwardly toward the slot to form a guide for guiding the edges of the pouch into the slots.

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10. The container of claim 8 wherein the container includes two rows of opposed slots so that the pouches are supported in pairs in the container.

10 11. The container of claim 8 wherein the first cooperating locator means comprises at least one a tapered pin, and the second cooperating locator means comprises at least one hole.

15 12. The container of claim 8 wherein the container body includes opposed side walls and opposed end walls, and a first said tapered pin is provided on a block fixed to an upper portion of one of the side walls, and a second said tapered pin is provided on a block fixed to an upper 20 portion of the other side wall diametrically opposite the first pin.

13. The container of claim 8 wherein the container body includes a flange extending at least partway along 25 each side wall, one of said flanges having a first said hole in vertical alignment with the first pin, and the other said flange having a second said hole in vertical alignment with the second said pin.

30 14. The container of claim 13 wherein the flanges extend along the entire length of the side walls.

15. The container of claim 9 wherein the slots are provided in rails which extend between the opposite ends 35 of the container body.

16. The container of claim 8 wherein the open bottom

of the container body comprises a plate, the said flanges being integral with, and part of, the plate, and at least one aperture in the plate for forming the open bottom.

5 17. The container of claim 16 wherein the plate includes a plurality of rectangular apertures for forming the open bottom of the container.

10 18. The container of claim 8 wherein the container is formed from a plurality of container modules, each module having a pair of said support elements, and connector elements for connecting the modules together to form the container.

15 19. The container of claim 18 wherein the connector elements comprise at least one bore passing through each module so that modules can be located in side-by-side relationship with the bores forming a channel through the modules, and a rod for location in the aligned channel to 20 connect the modules together.

20. The container of claim 19 wherein the modules include two bores extending substantially at right angles with respect to one another so that when the modules are 25 located together to form the container, rods are extended through the respective channels formed by the bores so that the rods connect the modules together in both a first direction of the container and a second direction perpendicular to the first direction.

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21. The container of claim 20 wherein the rods include at least one screw threaded end for receiving a nut.

35 22. The container of claim 21 wherein the rods may have an opposite end which includes a screw threaded end for receiving a nut or a pin head to thereby locate the

rods in the aligned channels.

23. A pallet for receiving a plurality of containers for receiving pouches containing a product, including:

5 a pallet body; and

a plurality of locator elements on the pallet body for registering with cooperating locator elements on the containers so that when the containers are loaded onto the pallet, the cooperating locator elements on the 10 containers engage the locator elements on the pallet to securely support and locate a first layer of the containers on the pallet.

24. The pallet of claim 23 wherein the pallet

15 includes handle receiving elements for receiving a handle to facilitate movement of the pallets after loading the pallets onto a trolley.

25. The pallet of claim 24 wherein the cooperating locator elements comprise tapered pins which project upwardly from the pallet body.

26. The pallet of claim 23 wherein the pallet body has a lower surface, the lower surface having a plurality 25 of grooves for registering with conveyor elements to enable the pallet to be moved on a conveyor.

27. The pallet of claim 23 wherein the pallet body is formed from longitudinally extending and transversely 30 extending frame elements, a plurality of beams being formed on an upper surface of the frame elements, and the tapered pin being provided on the beams.

28. A packaging system plant, including:

35 a filling and heat sealing line for filling pouches with a product and sealing the filled pouches; a container for receiving filled and sealed

- 75 -

pouches from the line, and for supporting a plurality of the pouches;

a transporter for receiving the containers loaded with the pouches to form a stack of the containers, and
5 for enabling the stack of containers to be moved from one place to another;

an ancillary processing station for receiving the containers transported by the transporter and for performing an ancillary treatment step on the filled
10 pouches while housed in the stack of containers; and

a packaging station for receiving the transporter carrying the stack of containers to enable the pouches to be removed from the containers and packaged for distribution.

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29. The system of claim 28 wherein the ancillary treatment stage comprises a retort for receiving the pouches.

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30. The system of claim 29 wherein the retort is a shower type retort.

31. The system of claim 28 wherein the ancillary treatment stage comprises a cooling station for cooling
25 heated pouches.

32. The system of claim 28 wherein the system includes a disperser plate for location on the stacked containers, the disperser plate having a plurality of
30 holes so that hot water flows onto the disperser plate and through the plurality of holes, and then passes down through the containers and over the pouches to treat the pouches.

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33. The system of claim 28 wherein the system includes stacking means for stacking the containers on the transporter after the containers have been loaded with the

pouches.

34. The system of claim 33 wherein the stacking means comprises a robot for engaging a loaded container and 5 moving the loaded container from a loading station to the transporter.

35. The system of claim 28 wherein the container includes:

10 a container body having an open top and an open bottom so water can drain through the open top, over the pouches supported in the container and out through the open bottom;

15 a plurality of support elements, each for supporting side edges of the pouch;

first cooperating locator means on an upper portion of the container body;

second cooperating locator means on a lower portion of the container body; and

20 wherein two like said containers are able to be stacked one above the other by the first cooperating locator means of one container engaging the second cooperating locator means of the other container.

25 36. The system of claim 35 wherein the support elements each comprise a pair of spaced apart slots for receiving the side edges of the pouch, each slot having a guide entrance formed by a pair of inclined surfaces which incline outwardly from the slot and downwardly toward the 30 slot to form a guide for guiding the edges of the pouch into the slots.

37. The system of claim 35 wherein the container includes a plurality of rows of opposed slots so that the 35 pouches are supported in side by side relationship in the container.

38. The system of claim 35 wherein the first cooperating locator means comprises at least one a tapered pin, and the second cooperating locator means comprises at least one hole.

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39. The system of claim 35 wherein the container body includes opposed side walls and opposed end walls, and a first said tapered pin is provided on a block fixed to an upper portion of one of the side walls, and a second said 10 tapered pin is provided on a block fixed to an upper portion of the other side wall diametrically opposite the first pin.

40. The system of claim 35 wherein the container body 15 includes a flange extending at least partway along each side wall, one of said flanges having a first said hole in vertical alignment with the first pin, and the other said flange having a second said hole in vertical alignment with the second said pin.

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41. The system of claim 40 wherein the flanges extend along the entire length of the side walls.

42. The system of claim 36 wherein the slots are 25 provided in rails which extend between the opposite ends of the container body.

43. The system of claim 35 wherein the open bottom of the container body comprises a plate, the said flanges 30 being integral with, and part of, the plate, and at least one aperture in the plate for forming the open bottom.

44. The system of claim 43 wherein the plate includes a plurality of rectangular apertures for forming the open 35 bottom of the container.

45. The system of claim 35 wherein the transporter

comprises a pallet.

46. The system of claim 45 wherein the pallet includes a pallet body, and a plurality of locator elements on the pallet body for registering with cooperating locator elements on the containers so that when the containers are loaded onto the pallet, the cooperating locator elements on the containers engage the locator elements on the pallet to securely support and locate a first layer of the containers on the pallet.

47. The system of claim 46 wherein the pallet includes handle receiving elements for receiving a handle to facilitate movement of the pallets after loading the pallets onto a trolley.

48. The system of claim 47 wherein the cooperating locator elements comprise tapered pins which project upwardly from the pallet body.

49. The system of claim 48 wherein the pallet body has a lower surface, the lower surface having a plurality of grooves for registering with conveyor elements to enable the pallet to be moved on a conveyor.

50. The system of claim 46 wherein the pallet body is formed from longitudinally extending and transversely extending frame elements, a plurality of beams being formed on an upper surface of the frame elements, and the tapered pin being provided on the beams.

51. The system of claim 35 wherein the transporter comprises a continuous conveyor for conveying stacked containers to the ancillary processing station.

52. The system of claim 51 wherein the conveyor passes through the ancillary processing station and then

to the packaging station.

53. A method of manoeuvring pouches in a packaging plant, comprising:

5 filling pouches with a product and sealing the filled pouches;

loading filled and sealed pouches into containers so the pouches are supported in the containers;

10 stacking the containers loaded with the pouches on a transporter;

moving the stacked containers on the transporter to an ancillary processing station for performing an ancillary treatment step on the filled pouches while housed in the stack of containers; and

15 moving the stacked containers on the transporter to a packaging station to enable the pouches to be removed from the containers and packaged for distribution.

54. The method of claim 53 wherein the ancillary treatment stage comprises a retort for receiving the pouches.

55. The method of claim 54 wherein the retort is a shower type retort.

25 56. The method of claim 53 wherein the method includes locating a disperser plate on the stacked containers, the disperser plate having a plurality of holes so that in the retort hot water flows onto the disperser plate and through the plurality of holes, and then passes down through the containers and over the pouches to treat the pouches.

30 57. The method of claim 53 wherein the ancillary treatment stage is a cooling station for cooling heated pouches.

58. The method of claim 53 wherein the transporter comprises a pallet upon which the containers are stacked and which pallet is moved to the ancillary processing station, and then to the packaging station.

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59. The method of claim 53 wherein the transporter comprises at least one conveyor for conveying the stacked containers to the ancillary processing station, and then to the packaging station.

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60. A system for handling containers which are to be loaded with pouches to facilitate movement of the pouches through a processing plant, including:

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a carriage for receiving an empty container;
first carriage moving means for moving the carriage from a container receiving position to a first container release position and returning the carriage to the container receiving position;

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loading means for loading the container into the carriage when the carriage is in the container receiving position;

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indexing means for receiving the container from the carriage at the release position and for indexing the container past a loading station at which filled and sealed pouches are loaded into the container as the container is indexed past the loading station;

a second carriage for receiving loaded containers from the indexing means;

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second carriage moving means for moving the second carriage from a loaded container receiving position to a second container release position; and

unloading means for moving the loaded container from the second carriage at the second release position and stacking the loaded container on a pallet.

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61. The system of claim 60 wherein the first carriage has first clamping means for clamping the container when

loaded into the first carriage so that the container is moved with the carriage as the carriage is moved from the receiving position to the release position, and which is disengaged from the container at the first release

5 position to enable the container to drop onto the indexing means.

62. The system of claim 60 wherein the indexing means comprises a continuous loop carrying a plurality of 10 abutment elements for engaging the container and indexing the container as the continuous loop is indexed.

63. The system of claim 62 wherein the continuous loop comprises a pair of continuous chains driven by a 15 motor and sprocket assembly.

64. The system of claim 62 wherein the abutment members comprise a plurality of bars which extend between the continuous chains and define receiving spaces for 20 receiving the container so that the container is engaged by one of the bars and indexed with the continuous chains and bars.

65. The system of claim 60 wherein the indexing means 25 includes guide means for receiving a container so that the container can slide on the guides as the container is indexed by the indexing means.

66. The system of claim 60 wherein the system 30 includes lifting means at the loaded container receiving position so that the container is lifted from the indexing means into a position for engagement by the second carriage.

35 67. The system of claim 60 wherein the second carriage includes second clamping means for engaging the container when received by the second carriage so that the

container can be moved by the second carriage to the second release position.

68. The system of claim 60 wherein the loading means 5 and the unloading means comprise a robot for performing both the loading of the empty containers into the first carriage and the unloading of filled containers from the second carriage.

10 69. The system of claim 60 wherein the carriages have sensors for detecting when a container is received in the first and second carriages.

15 70. The system of claim 60 wherein the system further includes a pallet moving conveyor for moving a pallet, from which the empty container is removed, to a stacking location, at which a filled container is deposited by the unloading means.

20 71. The system of claim 60 wherein the system further includes a supply conveyor for supplying pallets loaded with empty containers to the empty container unloading station, and a discharge conveyor for receiving pallets stacked with loaded containers and for transporting the 25 stacked pallet to a discharge station.

72. The system of claim 70 wherein the pallet moving conveyor extends between the supply conveyor and the discharge conveyor, and includes a first lifting means for 30 lifting the empty pallet above the supply conveyor so the empty pallet can be conveyed by the pallet conveyor to the stacking station, and lowering means at the stacking station for lowering the pallet onto the discharge conveyor.

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73. A pallet handling apparatus for receiving pallets stacked with containers, from which the containers are to

be unloaded, so the containers can be loaded with pouches, and then stacked on an empty pallet, said apparatus comprising:

5 a supply conveyor for conveying pallets stacked with containers to a container unloading station so the containers can be unloaded at the unloading station and supplied to a pouch loading station at which pouches are loaded into the containers;

10 a discharge conveyor for conveying pallets from a stacking station upon which loaded containers are stacked on a pallet, to a pallet discharge station;

15 a pallet moving conveyor extending between the unloading station and the stacking station for conveying an empty pallet from the unloading station to the stacking station;

first pallet transfer means at the unloading station for transferring a pallet from the supply conveyor at the unloading station onto the pallet moving conveyor; and

20 second conveyor transfer means at the stacking station for transferring the pallet from the moving conveyor onto the discharge conveyor.

74. The apparatus of claim 73 wherein the supply conveyor includes a plurality of chain conveyor section.

75. The apparatus of claim 73 wherein the discharge conveyor includes at least one chain conveyor which extends from the stacking station towards the discharge station, and a discharge roller conveyor at the discharge station.

76. The apparatus of claim 73 wherein the pallet moving conveyor includes an intermediate chain conveyor section and the first transfer means comprises a first roller conveyor at the unloading station, lifting means for raising the first roller conveyor relative to the at

least one supply chain conveyor so that lifting of the first roller conveyor engages the pallet and lifts the pallet above the at least one supply chain conveyor so the pallets can then move on the first roller conveyor and 5 onto the intermediate chain conveyor, a second roller conveyor at the stacking station, lowering means connected to the second roller conveyor for lowering the second roller conveyor to lower the pallet onto the at least one discharge chain conveyor section.

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77. The apparatus of claim 76 wherein the first raising means comprises a ram and guide assembly for moving the first roller conveyor in a vertical direction between a raised and lowered position.

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78. The apparatus of claim 77 wherein the second moving means comprises at least one ram and guide assembly for moving the second roller conveyor in a vertical direction between a raised and lowered position.

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79. The apparatus of claim 76 wherein the intermediate chain conveyor includes at least one drive sprocket and a motor for driving the sprocket, and therefore the chain conveyor.

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80. The apparatus of claim 76 wherein the first and second roller conveyors have a first drive motor and a second drive motor respectively for driving at least one of the rollers of each of the first and second roller 30 conveyors.

81. The apparatus of claim 76 wherein the plurality of chain conveyor sections each includes a drive sprocket and at least one motor for driving each conveyor chain 35 section.

82. The apparatus of claim 76 wherein the discharge

chain conveyor section includes a sprocket and at least one motor for driving the discharge chain conveyor section.

5 83. The apparatus of claim 76 wherein the discharge roller conveyor includes idler rollers so that the pallet can be rolled manually or under the influence of gravity on the first roller conveyor.

10 84. The apparatus of claim 73 wherein a pallet trolley is provided for supplying pallets stacked with empty containers to the supply conveyor and for receiving pallets stacked with loaded containers from the discharge conveyor, the trolley including an upper roller conveyor 15 section including a plurality of rollers so that pallets can be rolled off the trolley onto the supply conveyor and off the discharge conveyor onto the trolley, locking means for locking the pallet to the trolley so the trolley can then be moved to transport the pallet and the containers 20 from one place to another.

85. The apparatus of claim 74 wherein a trolley support is provided at a supply end of the supply conveyor and at a discharge station of the discharge conveyor, the 25 support comprising a pair of guide channels for receiving the wheels of the trolley, and allowing the trolley to be registered with the supply conveyor or the discharge conveyor, wheel locking means for locking the trolley to the trolley support to hold the trolley stationary 30 relative to the supply conveyor or discharge conveyor to enable the pallet to be moved from the trolley onto the supply conveyor or off the discharge conveyor onto the trolley.

35 86. The apparatus of claim 85 wherein the locking means comprises a spring biased catch which is engaged by the pallet as the pallet is moved onto the trolley, and

moved against the bias of the spring to locate behind a portion of the pallet to lock the pallet to the trolley.

87. The apparatus of claim 85 wherein the locking means includes a lever for pivotal movement to move the catch out of engagement with the portion of the pallet so the pallet can be released from the trolley.

88. The apparatus of claim 76 wherein the supply conveyor includes a chain conveyor section which forms the unloading station, the chain conveyor section having a pair of chains and means for circulating the chains about a continuous loop so a pallet can be moved on the section, and wherein the first pallet transfer means includes a subassembly mounted to the chain conveyor section, the subassembly carrying a first roller conveyor formed of a plurality of rollers, means for raising and lowering the subassembly and first roller conveyor relative to the chain conveyor section so that when a pallet is on the chain conveyor section at the unloading station, the subassembly can be raised to engage the pallet and lift the pallet above the chains of the chain conveyor section so the pallet can then be moved on the first roller conveyor in a direction transverse to the direction of movement on the chain conveyor section, and wherein the moving means is for lowering the subassembly so the roller conveyor is moved below the chains of the chain conveyor section to allow another pallet to move along the chain conveyor section; and

30 the discharge conveyor including a discharge conveyor chain section which defines the stacking station, the discharge chain conveyor section including a pair of chains for moving a pallet on the discharge chain conveyor section, a second subassembly mounted to the discharge chain conveyor section, and including a second roller conveyor, second moving means for raising the second subassembly and the second roller conveyor relative to the

discharge chain conveyor section so that in a raised position of the subassembly and the second roller conveyor, the pallet is able to move along the pallet moving conveyor and onto the second roller conveyor, the 5 second moving means also being for lowering the second roller conveyor to deposit the pallet on the chains of the discharge chain conveyor section; and

the first subassembly, the first roller conveyor and the second subassembly and the second roller conveyor 10 forming part of said pallet moving conveyor so that a pallet can be rolled from the first conveyor section along the pallet moving conveyor to the second roller conveyor.

89. The apparatus of claim 88 wherein the supply 15 conveyor chain section includes abutments for receiving a pallet to locate the pallet on the supply conveyor chain section so the pallet is accurately located at the unloading station.

20 90. The apparatus of claim 88 wherein holding means are provided on the supply conveyor chain section for engaging the pallet and holding the pallet at the unloading station.

25 91. The apparatus of claim 90 wherein second holding means are provided at the discharge chain conveyor section for releasably holding the pallet at the stacking station.

92. The apparatus of claim 76 wherein a container 30 indexing means is provided for indexing containers past a loading station at which pouches are loaded into the containers;

35 container loading and unloading means for unloading an empty container from a pallet at the unloading station and depositing the container on the indexing means for indexing past the pouch loading station; and

collecting a loaded container and depositing the loaded container onto a pallet at the stacking station.

93. A filling and heat sealing line for filling
5 pouches with product, comprising:
a filling station for loading a product into the
pouches;
a heat sealing station for heat sealing filled
pouches;
10 moving means for moving the pouches from the
filling station to the heat sealing station;
a vision system;
pouch moving means for moving pouches from the
heat sealing station past the vision system;
15 said vision system including:
(a) a light source for producing light so that light
is transmitted through a transparent region on one side of
the sealed pouch which overlaps a heat seal produced by
the heat sealing station;
20 (b) at least one camera for receiving light
transmitted through the seal; and
(c) processing means for determining from the light
received by the camera the integrity of the seal to
determine whether the pouch should or should not be
25 rejected.

94. The line of claim 93 wherein the pouch includes a
transparent strip which overlaps the heat seal to
facilitate transmission of light through the region of the
30 pouch in the vicinity of the heat seal to in turn
facilitate determination of whether the seal has been
properly formed.

95. The line of claim 93 the processing means
35 compares the light received by the cameras with a grey
scale to provide an indication of whether the seal is
properly formed.

96. The line of claim 93 the system includes a reject station which is activated by the processing means if a seal is determined to be inadequate so the pouch is
5 rejected from the line at the reject station.

97. The line of claim 96 wherein the reject station comprises a moveable door over which the pouches pass and which is open to enable the pouches to drop through the
10 door.

98. The line of claim 93 wherein the processing means is for determining whether pixels of the at least one camera see light intensity on a grey scale above a
15 predetermined grey scale value, and also determines whether a second predetermined number of adjacent pixels have a grey scale value above that predetermined number, and if so, produce the signal indicative of the seal not being properly formed so that the pouch can be rejected at
20 the reject station.

99. The line of claim 93 wherein the pouch is provided with notches and the processing means identifies the notches to in turn use the identified notches as a
25 point of reference for determining the inspection region defined by the transparent strip which is positioned at a known location with respect to the notches.

100. A seal integrity monitoring system for inspecting
30 the integrity of a seal in a pouch which has a transparent region on one side of the pouch, a translucent region on the other side of the pouch, and a seal formed between the transparent region and the translucent region, comprising:
a light source for producing radiation and
35 directing the radiation through the transparent region;
a camera for viewing the translucent region and for producing an image of the translucent region; and

- 90 -

a processor for processing the image captured by the camera to determine the integrity of the seal.

101. The system of claim 100 wherein the seal is a
5 heat seal and the transparent region comprises a transparent region in a first panel of the pouch and the translucent region is a translucent coating on a second panel of the pouch which is connected to the first panel by the seal, the first panel including a fluorescing
10 material at least in the vicinity of the transparent region, so that when the light source directs the light through the transparent region, the fluorescing material fluoresces to produce white light, and if the first and second panels are properly sealed together, a continuous
15 waveguide is provided for transmission of the white light to the translucent coating, and if the seal is not properly formed, a continuous waveguide is not formed, thereby allowing light to disperse where the seal is not properly formed so those parts of the seal appear as a
20 dark region on the translucent region.

102. The system of claim 100 wherein the translucent region forms a filter for filtering the white light so that the filtered light is received by the camera and the
25 processor processes the image of the filtered light to determine the integrity of the seal.

103. The system of claim 101 wherein the light source is an ultraviolet light source for producing ultraviolet
30 light of a wavelength from 320 to 350 nanometers.

104. The system of claim 101 wherein the camera comprises a CCD array type camera.

35 105. The system of claim 104 wherein the processor processes the images captured by the camera by determining pixels which have a grey value above a predetermined

value, thereby providing the indication of an improperly formed part of the seal.

106. The system of claim 105 wherein the processor 5 determines that the seal is satisfactory if a band of a predetermined thickness of properly formed seal can be defined from one side of the pouch to the other side of the pouch.

10 107. A seal integrity monitoring method for inspecting the integrity of a seal, the pouch having a first panel with a transparent region, a second panel having a translucent region, and the seal being formed between the first and second panels so the seal is between the first 15 panel and the translucent region, the method comprising:

irradiating the transparent region so that the radiation passes into the transparent region, and if the seal is properly formed, the first and second panels at the seal form a continuous waveguide for directing 20 radiation to the translucent region, and if the seal is not properly formed, light is dispersed at the improperly formed seal, thereby producing a dark region at the translucent region;

25 detecting the translucent region with a camera to obtain an image of the translucent region; and

processing the image captured by the camera to identify any dark regions appearing at the translucent region to thereby determine the integrity of the seal.

30 108. The method of claim 107 wherein the radiation has a wavelength of from 320 to 350 nanometers.

109. The method of claim 107 wherein the camera is a 35 CCD array camera and the processing step determines the grey scale value of pixels of the CCD array in order to identify dark regions in the image.

110. The method of claim 106 wherein the transparent region includes a fluorescing material so that when the light is directed to the transparent region, the fluorescent material fluoresces to produce white light

5 which passes through the continuous waveguide to the translucent region, or if the seal is not in tact, is dispersed at the regions where the seal is not in tact so that dark regions are produced at the translucent region.

10 111. The method according to claim 110 wherein the translucent region forms a filter for filtering the white light so that a predetermined colour of the white light passes through the filter and is detected by the camera to produce the image which is processed to determine the

15 integrity of the seal.